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(54) Title of the Invention: Metal Pipe Shape Nut

(57) Abstract:

PROBLEM TO BE SOLVED: To solve such a problem that a metal round bar type nut increases in its cost and working ability in mounting operation is reduced because the metal round bar type nut increases in its weight as its outer diameter increases.

SOLUTION: Inside a metal pipe having an inner diameter smaller than the distance between opposite sides of a hexagon or square nut, a fixing position is provided in which a distance between the opposite sides of the nut is ensured. In this position, the nut is sealed such that the direction of the thread hole of the nut is perpendicular to the axial center direction of the metal pipe, and the metal pipe is formed with a bolt insertion hole, which communicates with the thread hole of the nut.

Claims

1. A metal pipe shape nut, where a hexagon or square nut is held in a fixing position, which is ensured by the distance at the place where this nut is held, which is the same as the distance between the opposite sides of a hexagon or square nut, meanwhile all the other inner diameters of the metal pipe are smaller than the distance between opposite sides of a hexagon or square nut, so the direction of the thread hole of this nut is perpendicular to the axial center direction of the metal pipe, and where the metal pipe is formed with a bolt insertion hole, which communicates with the thread hole of the nut.
2. A metal pipe shape nut as mentioned in claim 1, where the part of the fixing position inside the metal pipe, where a distance for the opposite sides of a hexagon or square nut is ensured, by forming it in such a way, that the inner diameter of the metal pipe at the fixing position is larger than the other inner diameters, either by making the pipe material thinner or by beating the pipe material out in the outer direction.
3. A metal pipe shape nut as mentioned in claim 1 or claim 2, where the bolt insertion hole of the metal pipe, which communicates with the inner thread of the hexagon or square nut, is opened in advance in the metal sheet, where the metal pipe is formed of.

Description

(0001)

TECHNICAL FIELD OF THE INVENTION

This invention belongs to metal pipe shape nuts, where round bar type nuts are formed out of metal pipes, where an inner thread is cut, perpendicular to the axial center direction of the metal round bar.

(0002)

BACKGROUND OF THE INVENTION

Round bar type nuts are forming usually tightening systems, together with a bolt and a tightening band. The metal tightening band is built such, that the metal band has on both ends in longitudinal direction wrap arounds attached, which have a uniform inner diameter for holding a round bar type nut, the tips of these wrap arounds are fixed to the metal band through welding or other means, and there are openings with a long hole in the wrap around so that a bolt can be inserted into the thread of the round bar type nut, which is fixed to the wrap around, and on one end of the metal tightening band there is a round bar type nut attached, on the other end there is a similar round bar attached, but without a thread cut, so it can be assembled with a bolt, so through the tightening of the bolt the inner diameter of the metal tightening band will become smaller and everything inserted inside will be held tightly.

(0003) Tightening systems comprised of round bar type nut, bolt and tightening band, are used for pipe couplings as for example showed in fig. 9. This pipe coupling has a cylindrical formed housing E, which is in circumferential direction discontinued and which has at this discontinued place a tightening system comprised of a metal round bar type nut A, a metal round bar type nut F, a bolt B, a tightening band C, which has inside a rubber sleeve D for sealing up a inserted pipe.

(0004)

PROBLEMS TO BE SOLVED

The currently used metal round bar type nut, which had cut by machine an inner thread perpendicular to the axis of the metal round bar, have a remarkable increase in weight when the outer diameter becomes larger, so due to the material characteristics of metal it becomes very expensive and becomes finally a main cost factor for the product. The same holds true for the weight, so the larger in size the worser the mounting operation.

(0005) So if one uses a metal pipe instead of metal round bar type nut, one might think to cut the thread directly into the metal pipe shape nut perpendicular to the metal pipe axis, but to get the same amount of thread ridges as a standard nut, the material thickness of the pipe would have to be increased and no weight reduction would be gained.

(0006) So one might think of fixing a nut to the metal pipe shape nut by welding it inside, to ensure the same amount of thread ridges as a standard nut, without increasing the material thickness of the pipe, but by this method, one has to ensure enough space inside the pipe for the welding operation, a necessary condition is a large inner diameter of the pipe, so it is not applicable to pipes where the inner diameter is limited. Beside that, if the welding method is chosen, the material has to be adjusted through heat treatment, because the material characteristics were changed by the heat of the welding.

(0007)

MEANS FOR SOLVING THE PROBLEMS

This invention is going to solve these problems by the following means:

(0008) First, basically by providing a metal pipe shape nut, where a hexagon or square nut is held in a fixing position, which is ensured by the distance at the place where this nut is held, which is the same as the distance between the opposite sides of a hexagon or square nut, meanwhile all the other inner diameters of the metal pipe are smaller than the distance between opposite sides of a hexagon or square nut, so the direction of the thread hole of this nut is perpendicular to the axial center direction of the metal pipe, and where the metal pipe is formed with a bolt insertion hole, which communicates with the thread hole of the nut.

(0009) In detail this can for example be provided by a metal pipe shape nut, where the part of the fixing position inside the metal pipe, where a distance for the opposite sides of a hexagon or square nut is ensured by forming it in such a way, that the inner diameter of the metal pipe at the fixing position is larger than the other inner diameters, either by making the pipe material thinner or by beating the pipe material out in the outer direction.

(0010) By providing a metal pipe shape nut, where for example the bolt insertion hole of the

metal pipe, which communicates with the bolt hole of the hexagon or square nut, is opened in advance in the metal sheet, where the metal pipe is formed of.

(0011)

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the following the embodiments of this invention are explained based on the drawings.

(0012) Fig. 1 is a perspective view, which shows an embodiment of a metal pipe shape nut according to this invention, fig. 2 is a front elevational view of the same part, fig. 3 is a sectional view, sectioned at A-A. In the drawings, 1 refers to the metal pipe, 2 to the hexagon nut.

(0013) The metal pipe 1 has the inner diameter length 1a, which is smaller than the distance 2c determined by the opposite sides 2a, 2b of the hexagon nut 2, forming a fixing position ensured by the distance 2c determined by the opposite sides 2a, 2b of the hexagon nut 2. Here the fixing position is formed by making the material thickness of the pipe at this place 1b thinner, so the inner diameter of the metal pipe at the fixing position becomes larger than the rest of the inner diameters. 1d is the bolt insertion hole, opened in the metal pipe 1, which communicates with the thread hole 2d of the hexagon bolt 2 mentioned later.

(0014) Hexagon nut 2 is held at the fixing position, which is formed by making the material thickness of pipe 1b of the metal pipe 1 thinner, as mentioned above, so that the direction of the thread hole 2d of this nut 2 is perpendicular to the axis 1c of metal pipe 1. The hexagon nut 2 may be held in metal pipe 1 in one place or in more than one place, depending on the use.

(0015) In this way the metal pipe shape nut is formed as a whole with hexagon nut inserted.

(0016) Fig. 4 to fig. 6 show a different embodiment of metal pipe shape nut according to this invention, where fig. 4 is a perspective view, fig. 5 is a front elevational view and fig. 5 is a sectional view sectioned at B-B. In the drawings, 1 refers to the metal pipe, 2 to the hexagon nut.

(0017) The metal pipe 1 has the inner diameter length 1a, which is smaller than the distance 2c determined by the opposite sides 2a, 2b of the hexagon nut 2, forming a fixing position ensured by the distance 2c determined by the opposite sides 2a, 2b of the hexagon nut 2. Here the fixing position is formed by beating out the pipe material at this place 1b, so the inner diameter of the metal pipe at the fixing position becomes larger than the rest of the inner diameters. 1d is the bolt insertion hole, opened in metal pipe 1, which communicates with the thread hole 2d of the hexagon bolt 2 mentioned later.

(0018) Hexagon nut 2 is held at the fixing position, which is formed by beating out the pipe material 1b of the metal pipe 1 as mentioned above, so that the direction of the thread hole 2d of this nut 2 is perpendicular to the axis 1c of the metal pipe 1.

(0019) In this way the metal pipe shape nut is formed as a whole with hexagon nut 2 inserted.

(0020) Below is shown an example for the production method of such a metal pipe shape nut.

(0021) First of all, when the workpiece is still a metal sheet, in a pressing process there will be punched out the bolt insertion hole 1d, so that the thread hole 2d of the enclosed hexagon

bolt can be used, and together with that only at the place, where the hexagon nut 2 will be held in the formed pipe 1 ensured by the distance inside the formed pipe in the dimension of the opposite sides 2a, 2b of the hexagon nut 2 only at this place, where the hexagon nut is held, either the thickness of the metal sheet will be pressed thinner or it will be beaten out in the direction, which will be later the outside of the pipe. In the press processing the enclosing of the hexagon nut and the forming of the pipe will be executed at the same time. After the pipe is formed, the joint in circumferential direction may be enforced by something like welding.

(0022) To use the strength of hexagon nut 2 effectively and to measure effectively the rigidity of the hexagon nut 2, the one end in axial center direction of the thread hole 2d of hexagon nut 2, or one may say the both sides outside of the metal pipe 1, should be level 1e as shown in fig. 7 and fig. 8.

(0023) Until now the explanation of the embodiment focused on the use of a hexagon bolts but the same holds true when square bolts are used.

(0024) A metal pipe shape nut formed as explained above can be used for example instead of the round bar type nut A in fig. 9. Of course the use of the metal pipe shape nut is not limited to this use.

(0025)

EFFECT OF THE INVENTION

This invention is built as mentioned above and has the following effects:

(0026) Compared with the metal round bar type nut, less material is required so due to its low price, it is more economical and due to its lighter weight, it helps to improve its handling.

(0027) Because the hexagon or square nut is fixed inside a metal pipe, which inner diameter is smaller than the distance between the opposite sides of the hexagon or square nut and where a fixing position for the hexagon or square nut is formed where the distance same as the distance between the opposite sides of the hexagon or square nut is ensured, in such a way, that the thread hole direction is in the axial center direction of the metal pipe, the hexagon or square nut can neither move nor turn, so turning of the nut when the bolt is turned is prevented, and also the drop out out of the fixing position.

(0028) The serial processing is executed by pressing only, so it is easy to work.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1: A perspective view, which shows the embodiment of the invented metal pipe shape nut

Fig. 2: The same in front elevational view

Fig. 3: A sectional view, the section A-A in fig. 2

Fig. 4: A perspective view, showing a different embodiment of the invented metal pipe shape nut

Fig. 5: The same in front elevational view

Fig. 6: A sectional view, the section B-B in fig. 5

Fig. 7: A perspective view, showing another embodiment of the invented metal pipe shape nut

Fig. 8: Shows another embodiment of the metal pipe shape nut, showed in fig. 7

Fig. 9: A sectional view, which explains the actual use of the current metal round bar type nut

EXPLANATION OF THE SYMBOLS

1: metal pipe

1a: inner diameter of metal pipe

1b: pipe thickness at the fixing position of the hexagon nut

1c: axial center

1d: bolt insertion hole

1e: level

2: hexagon nut

2a: hexagon nut side

2b: hexagon nut side

2c: opposite sides of the hexagon nut

2d: thread hole